

REMARKS/ARGUMENTS

The Applicant has carefully considered this application in connection with the Examiner's Action and respectfully requests reconsideration of this application in view of the foregoing amendment and the following remarks.

The Applicant originally submitted Claims 1 through 26 in the application. Claims 22-26 have been previously canceled, and the Applicant has currently amended Claims 1-8, 10-12, 14-15, and 17-18. Accordingly, Claims 1 through 21 are currently pending in the application.

I. Formal Matters and Objections

The Examiner has objected to Claims 2, 6, 17, and 18 for various formal reasons. In response, the Applicant has amended these claims to correct these informalities. The Examiner has also objected to the drawings because they include references that are not mentioned in the description. In response, the Applicant is submitting a replacement sheet which addresses these inadvertent typographical errors.

II. Rejection of Claim 1 under 35 U.S.C. §102

This claim is rejected under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 6,586,841 to Daneman, et al. (Daneman). Specifically, the Examiner relies on Figs. 4A and 4B that show the various elements of the claims. However, this reliance is inadequate to establish a 102(e) rejection for two reasons. First, as established by the 131 Affidavit, which is forthcoming and will be submitted in a supplemental response (the inventor had failed to provide the signed 131 Affidavit at the time this response was due), Daneman is antedated by the present invention. The filing date of Daneman is April 10, 2000, and as set forth in the 131 Affidavit, the present invention has a conception that pre-dates the filing date of Daneman.

Second even if Daneman were a valid 102(e) reference, Daneman does not teach each and every element of the claimed invention, as presently recited, either expressly or inherently. Daneman is primarily directed to a method of making landing pads in a microelectro-mechanical systems device. The landing pads reduce “stiction” that can cause the mirror to stick to the substrate and prevent the mirror from rotating as desired. (See, Column 1, lines 40-45, and Column 3, lines 15-26). As taught by Daneman, the mirror element 400 is formed from a device layer 402, as described with respect to FIGS. 2A-2E or 3A-3F. (Column 5, lines 44-48), and as seen by those same figures, the thickness of the mirror element 400 is not defined by the thickness of the device layer 402. To the contrary, while the landing pads have a thickness that is substantially the same as the device layer 402, the thickness of the mirror element 400 is not substantially defined by the thickness of the device layer 402, inasmuch as its thickness is substantially thinner than the thickness of the device layer 402. Thus, Daneman fails to teach each element of Claim 1, and therefore, it does not anticipate Claim 1.

III. Rejection of Claims 1-4 and 11 under 35 U.S.C. §102

These claims are rejected under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 6,415,070 to Munoz-Bustamante, et al. (Munoz). Munoz discloses a MEMS device wherein the optical element comprises a metal beam layer 45 that lays over a metal hinge layer 43. (Column 3, lines 31-44 and Figs. 3C and Fig 4). As seen in Munoz, there is no teaching of an optical element portion that has a length less than a length of the support portion, as required by these claims. The optical element, which is the metal beam layer 45 in Munoz, has a length that is the same as the length of the metal hinge layer 43 in that the metal beam layer 45 extends across the entire length of the metal hinge layer 43 as shown in Fig. 3C and Fig. 4.

Thus, Munoz, fails to teach, either expressly or inherently, each and every element of the claimed inventions of Claims 1-4 and 11. Therefore, Munoz does not anticipate the inventions

recited in these claims. Accordingly, the Applicant respectfully requests that the Examiner withdraw the 102 rejection.

IV. Rejection of Claim 14 under 35 U.S.C. §102

This claim is rejected under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 6,236,491 to Goodwin-Johansson (Goodwin). Goodwin discloses a MEMS device wherein improved operating voltage characteristics are achieved by defining a non increasing air gap between the substrate electrode and a flexible composite electrode. A medial portion of a multilayer flexible composite overlying the electromechanical substrate is held in position regardless of the application of electrostatic force. A moveable distal portion of the flexible composite is biased to curl naturally due to differences in thermal coefficients of expansion between the component layers. In response to electrostatic forces, the distal portion moves and thereby alters the distance separating the flexible composite from the underlying microelectronic surface. (Abstract).

There is no explicit or inherent teaching in Goodwin of a support portion that has an optical element located on an end of the support portion opposite to that of an actuating end. In contrast, Goodwin teaches that the optical element 100 is located on the same end as the actuating end where electrode 20 is located, which is used to move the optical element 100. (See, Column 8, lines 58-67). Thus, Goodwin, fails to teach either expressly or inherently each and every element of the claimed inventions of Claim 14. Therefore, Goodwin does not anticipate the inventions recited in this claim. Accordingly, the Applicant respectfully requests that the Examiner withdraw the 102 rejection.

V. Rejection of Claims 2-6 under 35 U.S.C. §103

These claims are rejected under 35 U.S.C. §103(a) as unpatentable over Daneman. As stated above, Daneman is not a proper 102(e) reference, and it does not teach each element of Claim 1, on

which Claims 2 through 6 depend. There is no suggestion or teaching in Daneman of forming the mirror element 400 such that it has a thickness that is substantially defined by the thickness of the device layer 402, and one skilled in the art would not be motivated to have the thickness of the mirror element 400 substantially the same thickness as the device layer 402 because, according to Daneman's teachings, it is important that the landing pads 404 protrude beyond the mirror element 400 to prevent stiction. (See, Column 1, lines 40-45; Column 3, lines 15-26 and Column 5, lines 46-55).

Therefore, Daneman fails to teach or suggest each element of the invention recited in independent Claim 1 and its dependent Claims 2-6, and as such, it fails to establish a *prima facie* case of obviousness regarding Claims 2-6.

Accordingly, in view of the foregoing remarks, the cited reference does not support the Examiner's rejection of Claims 2-6 under 35 U.S.C. §103(a).

VI. Rejection of Claims 12, 13 and 17 under 35 U.S.C. §103

These claims are rejected under 35 U.S.C. §103(a) as unpatentable over Munoz in view of U.S. Patent No. 5,960,132 to Lin (Lin). As stated above, Munoz does not teach each element of Claim 11 on which Claims 12 and 13 depend. There is, however, also no suggestion or teaching in the combination of Munoz and Lin of a support portion formed from a first layer that has an actuating plate on one end of the support portion with an optical element that has a length less than a length of the support portion coupled to and depending from an end of the support portion opposite to the end at which the actuating plate is coupled.

As discussed above, the entire optical element 45, as disclosed by Munoz, is a disk that can be actuated by a number of electrodes 51-54, such that the disk may be moved in a number of directions. Likewise, Lin, is also directed to a disk-shaped MEMS device. The Lin device includes a reflective panel 106 that is pivotally connected to a base member 104 by a hinging structure 109.

An actuator 108 is connected to the base member 104 and to the reflective panel 106. When energized, the actuator 108 moves back and forth to cause the hinged reflective panel 106 to move between a reflective state and a non-reflective state. (Column 5, lines 41-67 and Column 6, lines 1-7).

As recited in Claim 1 from which Claims 11, 12 and 13 depend, the support portion is defined from the first layer and has an actuating end on one end of the support portion and an optical element depending from an opposite end of the support portion. There is no teaching or suggestion in Lin that the base member 104 is defined by a first layer of a multi-layer substrate. Further, the base member 104 does not have an actuating end. In contrast, the actuator 108 as taught by Lin is a separate substrate that is slidably coupled to the base member 104.

Furthermore, one skilled in the art would not be motivated to combine the various aspects of Munoz with Lin because while they are both MEMS devices, they function in very different ways. For example, the device in Munoz is configured to constantly receive an optical signal. The device is then operated to alter the tilt angle of the mirror to re-direct the optical signal to a different path. In contrast, the Lin device does not constantly receive an optical signal. As shown in FIG. 5, the mirror portion is intended to lay flat and out of the optical path until it is desirable to re-direct the optical signal, at which time, the actuator 108 is moved to cause the mirror to pop up. Given these disparate structures and methods of operation, to mix and match the teachings of Munoz and Lin in attempt to arrive at the presently claimed inventions is nothing short of improperly using hindsight.

Thus, the combination fails to teach or suggest the device as recite in Claim 1 and its dependent Claims 11, 12 and 13, and there is no other teaching or suggestion that would provide the motivation necessary for one skilled in the art to re-make either device as taught by Munoz or Lin into the device recited in those claims for the reasons stated above.

Claim 17 contains elements similar to those discussed above regarding Claims 1 and 11-13. Therefore, for these same reasons, the asserted combination fails to teach or suggest the invention recited in Claim 17 as well.

In view of the foregoing, the asserted combination fails to teach or suggest each element of the inventions recited in independent Claim 1 and its dependent claims 11, 12 and 13 and in independent Claim 17, and as such, it fails to establish a *prima facie* case of obviousness regarding these claims.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 12, 13 and 17 under 35 U.S.C. §103(a).

VII. Rejection of Claims 1-4 under 35 U.S.C. §103

These claims are rejected under 35 U.S.C. §103(a) as unpatentable over Goodwin. Claim 1 requires that the support portion is defined from the first layer and is rotatably coupled to the multi-layer substrate. As seen from Goodwin, neither, layer 60 or layer 110, which are the only layers that could be considered to be support layers, are rotatably coupled to the multi-layer substrate. These layers are clearly fixed in position and the only thing that moves is the movable portion 100. There is no other teaching or suggestion in Goodwin that the Applicant can find that teaches or suggests that either layer 60 or 110 can be rotatably coupled to the multi-layer substrate. Moreover, given the materials from which the device in Goodwin is made and the fact that the thermal coefficients of expansion of the materials holds the reflective element 100 in a curled state until moved by the activation of the electrode 20, one who is skilled in the art would not be motivated to make either layer 60 or 110 rotatably coupled to the multi-layer substrate.

Therefore, Goodwin fails to teach or suggest each element of the invention recited in independent Claim 1 and its dependent Claims 2-4, and as such, it fails to establish a *prima facie*

case of obviousness regarding these claims. Accordingly, in view of the foregoing remarks, the cited reference does not support the Examiner's rejection of Claims 2-4 under 35 U.S.C. §103(a).

VIII. Rejection of Claims 5-8, 15 and 16 under 35 U.S.C. §103

These claims are rejected under 35 U.S.C. §103(a) as unpatentable over Goodwin in further view of Lin. The Applicant respectfully disagrees. First, the combination of Goodwin and Lin is improper because while Lin does teach a support portion that is rotatably coupled to a substrate, there is no motivation for one skilled in the art to make either support portion 60 or 110 of Goodwin rotatably coupled to the multi-layer substrate for the reasons just stated above, and there is no motivation for one skilled in the art to take the materials taught by Goodwin and use them in Lin's device, because Lin does not operate under the principles of using thermal coefficients of expansion. It would also be undesirable for the reflective element of Lin to stay in a static curled state because such a state would cause the reflective element to be constantly in the path of optical signal when there is no electrical impulse provided to the electrode, which is contrary to the purpose and operation of Lin's device.

Additionally, even if the combination were proper, there is no teaching or suggestion in the combination of a support portion defined by a first layer that has an optical element portion coupled to and depending from an end of the support portion opposite the actuating end, as recited in Claim 1 from which Claims 5-8 depend. As discussed above, the actuating end and the optical element in Goodwin are located on the same end instead of opposing ends. Lin fails to cure the deficient teachings of Goodwin because there is no teaching or suggestion in Lin that the base member 104 is defined by a first layer of a multi-layer substrate. Further, the base member 104 does not have an actuating end. In contrast, the actuator 108 as taught by Lin is a separate substrate that is slidably coupled to the base member 104, and one who is skilled in the art would have no motivation to

combine the various teachings of Goodwin and Lin to arrive at the claimed device without the improper use of hindsight.

Claims 15 and 16 depend from Claim 14, which contains similar elements as Claim 1, and as such, the combination fails to teach or suggest every element of Claim 14, and thus its dependent Claims 15 and 16 for the same reasons as just given above regarding Claim 1.

Therefore, the asserted combination fails to teach or suggest each element of the invention recited in independent Claim 1 and its dependent Claims 5-8, and Claim 14 and its dependent Claims 15-16. Therefore, the combination fails to establish a *prima facie* case of obviousness regarding these claims. Accordingly, in view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 5-8 and 15-16 under 35 U.S.C. §103(a).

IX. Rejection of Claims 9 and 10 under 35 U.S.C. §103

These claims are rejected under 35 U.S.C. §103(a) as unpatentable over Goodwin in view of Lin and in further view of U.S. Patent No. 6,388,789 to Bernstein (Bernstein). Claims 9 and 10 depend from Claim 1, and as such, the arguments set forth above with respect to the asserted combination of Goodwin and Lin regarding Claim 1, apply to Claims 9 and 10 as well. However, the Examiner further relies on Bernstein for the teaching of layers comprising silicon and an insulation layer, but Bernstein does not teach or suggest anything that would cure the deficiencies in the Goodwin and Lin combination, as discussed above.

Bernstein's structure is similar to the structure taught in Munoz in that it is directed to a MEMS device that can be tilted in a number of directions by using a number of electrodes located under the MEMS device. There is no teaching or suggestion in Bernstein of a support portion formed from a first layer that has an actuating end on one end and an optical element that is coupled to and depending from an opposite end of the support portion. Moreover, there is nothing in this

combination that would lead one skilled in the art to arrive at the inventions now recited in Claim 1 and its dependent Claims 9 and 10.

Therefore, the combination of Goodwin, Lin and Bernstein fails to teach or suggest each element of the invention recited in independent Claim 1 and its dependent Claims 9-10, and as such, it fails to establish a *prima facie* case of obviousness regarding these claims. Accordingly, in view of the foregoing remarks, the cited reference does not support the Examiner's rejection of Claims 9 and 10 under 35 U.S.C. §103(a).

X. Rejection of Claim 18 under 35 U.S.C. §103

This claim is rejected under 35 U.S.C. §103(a) as unpatentable over Munoz in view of Lin and in further view of U.S. Patent No. 6,411,753 to Ao (Ao). As discussed above, there is no motive to combine the teachings of Munoz and Lin, and even if combined, the combination of Munoz and Lin fails to teach or suggest all the elements of Claim 17 on which 18 depends. There is no suggestion or teaching in the combination of Munoz and Lin of an actuating plate on one end of the support portion with an optical element that has a length less than a length of the support portion coupled at and depending from an end of the support portion opposite to the end at which the actuating plate is coupled. Ao fails to cure the deficiencies in this combination.

Ao is simply relied on by the Examiner for the teaching of collimating/focusing lenses. Beyond this teaching, however, Ao adds nothing to the combined teachings of Munoz and Lin that would lead one skilled in the art to the inventions recited in Claim 17, and thus, Claim 18.

Therefore, the combination of Munoz, Lin and Ao fails to teach or suggest each element of the invention recited in independent Claim 17 and its dependent Claim 18, and as such, it fails to establish a *prima facie* case of obviousness regarding these claims. Accordingly, in view of the foregoing remarks, the cited reference does not support the Examiner's rejection of Claim 18 under 35 U.S.C. §103(a).

XI. Rejection of Claims 19 and 20 under 35 U.S.C. §103

These claims are rejected under 35 U.S.C. §103(a) as unpatentable over Munoz in view of Lin and in further view of Bernstein. As stated above, there is no motivation to combine Munoz and Lin, and even if combined, the combination of Munoz and Lin fails to teach or suggest each element of Claim 17 on which Claims 19 and 20 depend because there is no suggestion or teaching in the combination of Munoz and Lin of an actuating plate on one end of the support portion with an optical element that has a length less than a length of the support portion coupled at and depending from an end of the support portion opposite to the end at which the actuating plate is coupled. As already discussed above, Bernstein does not add anything to the asserted combination that would cause the combination to teach or suggest the missing elements in Munoz and Lin.

Thus, the combination fails to teach or suggest the device as recited in Claim 17 and its dependent Claims 19 and 20, and there is no other teaching or suggestion that would provide the motivation necessary for one skilled in the art to re-make the devices as taught by Munoz, Lin and Bernstein.

Therefore, the asserted combination fails to teach or suggest each element of the inventions recited independent Claim 17 and its dependent claims 19 and 20, and as such, it fails to establish a *prima facie* case of obviousness regarding these claims.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 19 and 20 under 35 U.S.C. §103(a).

XII. Rejection of Claim 21 under 35 U.S.C. §103

This claim is rejected under 35 U.S.C. §103(a) as unpatentable over Munoz in view of Lin and Bernstein and in further view of U.S. Application 2001/0046346 to Burns (Burns). As stated above, the combination of Munoz, Lin and Bernstein fails to teach or suggest each element of Claim 17 on which Claim 21 depends. First, the combination of Munoz and Lin is improper for reasons

already stated. In addition, there is no suggestion or teaching in the combination of Munoz, Lin and Bernstein of an actuating plate on one end of the support portion that is defined by a first layer with an optical element that has a length less than a length of the support portion defined by a second layer and that is coupled at and depending from an end of the support portion opposite to the end at which the actuating plate is coupled.

Burns is relied on by the Examiner for the teachings of a working surface having a 111 crystal orientation. However, the structure taught by Burns is very similar to the structure taught by Munoz and for the same reasons as discussed above with regarding Munoz, Burns would have the same deficiency, and as such, does not add anything to the asserted combination that would cause the combination to teach or suggest the missing elements in Munoz, Lin and Bernstein.

Thus, the combination fails to teach or suggest the device as recited in Claim 17 and its dependent Claim 21, and there is no other teaching or suggestion that would provide the motivation necessary for one skilled in the art to re-make the devices as taught by Munoz, Lin, Bernstein and Burns.

Therefore, the asserted combination fails to teach or suggest each element of the inventions recited independent Claim 17 and its dependent Claim 21, and as such, it fails to establish a *prima facie* case of obviousness regarding these claims.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claim 21 under 35 U.S.C. §103(a).

IV. Conclusion

In view of the foregoing amendment and remarks, the Applicant now sees all of the Claims currently pending in this application to be in condition for allowance and therefore earnestly solicits a Notice of Allowance for Claims 1-21.

The Applicant requests the Examiner to telephone the undersigned attorney of record at (972) 480-8800 if such would further or expedite the prosecution of the present application.

Respectfully submitted,

HITT GAINES, P.C.

A handwritten signature in dark ink, appearing to read "G. Parker", written over the printed name.

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